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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/501,405	07/15/2004	Masashi Gabe	953.1017	2649

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EXAMINER
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NGUYEN, TU MINH

ART UNIT	PAPER NUMBER
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3748

DATE MAILED: 10/05/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/501,405

Applicant(s)

GABE ET AL.

Examiner

Tu M. Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 22 August 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,3,5,6,8,10 and 13 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3,5,6,8,10 and 13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 July 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.

- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_.

### DETAILED ACTION

1. An Applicant's Amendment filed on August 1, 2006 and an Applicant's Supplemental Amendment filed on August 22, 2006 have been entered. Claims 1 and 6 have been amended; and claim 13 has been added. Overall, claims 1, 3, 5, 6, 8, 10, and 13 are pending in this application.

#### *Claim Rejections - 35 USC § 103*

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office Action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, 5, 6, 10, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pott (U.S. Patent 5,992,142) (Pott'142) in view of Pott (U.S. Patent 6,164,064) (Pott'064).

Re claims 1, 6, and 13, as shown in Figures 1, 2, and 4, Pott'142 discloses an exhaust gas purifying system and a method of exhaust gas purification to be carried out with use of said exhaust gas purifying system provided with a NOx occlusion reduction type catalyst (7) having a catalyst metal (platinum) and a NOx occluding substance (alkali or alkaline earth metal) that is transformed into nitrate as a result of occluding activities and is then regenerated back to allow continuation of NOx occlusion (see lines 12-15 of column 1 and lines 11-27 of column 4), in an

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exhaust passage (3) of a diesel engine (1) and a control unit (13) comprising a normal control operation means (non-regeneration mode such as steps 21 and 23), a regeneration control initiation judging means (step 22) for detecting a regeneration control initiation timing for the NOx occlusion reduction type catalyst, a rich-burn control operation means (step 28 with "< LAMBDA RICH" answer and step 29) for executing a rich-burn control operation for generating an exhaust gas which is in a fuel-rich state, accompanying recirculation of exhaust gas (4), and a catalyst activation control operation means (step 28 with "< LAMBDA RICH" answer and step 29) for executing a control operation for activating the NOx occlusion reduction type catalyst immediately before the rich-burn control operation is performed, and performing the catalyst activation control operation by the catalyst activation control operation means when it is judged by the regeneration control initiation judging means that a regeneration control for the regeneration of the NOx occlusion reduction type catalyst is to be initiated (step 22 with YES answer) and thereafter executing a rich-burn control operation (step 28 with "< LAMBDA RICH" answer and step 29) accompanying a recirculation of EGR gas by the rich-burn control operation means to thereby regenerate the NOx occlusion reduction type catalyst,

wherein the catalyst activation control operation means (step 28 with "< LAMBDA RICH" answer and step 29) executes a burning control in the rich vicinity of the stoichiometric air-fuel ratio in a range of less than 1.0 in the condition of an EGR valve being totally closed (see lines 55-58 of column 6), and at the same time executing a fuel injection in the fuel injection into cylinders and controlling the torque generation of the diesel engine by an intake control (8) to reduce a torque variation during the transition from the normal control operation to the catalyst activation control operation (as clearly shown in Figure 4), and

wherein regeneration control is performed to thereby purge or release NO<sub>x</sub> from the NO<sub>x</sub> occlusion reduction type catalyst (7).

Pott'142 recognizes that the NO<sub>x</sub> catalyst (7) also adsorbs SO<sub>x</sub> in a lean air-fuel ratio control; wherein a purge or release of SO<sub>x</sub> is performed less often than that for NO<sub>x</sub>, and the temperature and time required for the purging of SO<sub>x</sub> are higher and longer, respectively, than those for purging NO<sub>x</sub> (see lines 26-34 of column 9).

Pott'142, however, fails to disclose that instead of rich, the catalyst activation control operation means executes a burning control in the vicinity of the stoichiometric air-fuel ratio in a range of 0.8 to 1.1 in terms of an excess air factor; and that during the catalyst activation control operation means, the fuel is injected in a multi-stage with an early injection.

As illustrated in Figures 1 and 3, Pott'064 discloses a process to desulfurize a NO<sub>x</sub> occlusion reduction type catalyst (3) located in an exhaust path (2) of a diesel engine. During this process, Pott'064 teaches that it is conventional in the art to perform a catalyst activation control operation to raise a temperature of the catalyst to a desulfurization temperature (lines 57-60 of column 1); wherein the fuel is injected in a multi-stage with an early injection and an engine air-fuel ratio is set to oscillate about the stoichiometric air-fuel ratio (lines 1-7 of column 4). It would have been obvious to one having ordinary skill in the art at the time of the invention was made, to have utilized the teaching by Pott'064 in the system and method of Pott'142 because Pott'142 also needs to raise the NO<sub>x</sub> catalyst to a released temperature of NO<sub>x</sub>, since the use thereof would have been routinely practiced by those with ordinary skill in the art to effectively removed harmful NO<sub>x</sub> and SO<sub>x</sub> emissions in the exhaust gas.

Pott'142 discloses the claimed invention except for specifying an optimum range of an air-fuel ratio between 0.8 and 1.1 for the catalyst activation control operation means. It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide a specific optimum range of excess air factor during the catalyst activation control operation means in Pott'142, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Re claims 5 and 10, the modified system and method of Pott'142 comprise performing the rich-burn control operation to recirculate EGR gas to generate an exhaust gas which is in a fuel-rich state and to control the torque generation of the diesel engine by an intake control of the diesel engine to reduce a torque variation during the transition from the catalyst activation control operation to the rich-burn control operation (see Figure 4).

4. Claims 3 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pott'142 in view of Pott'064 as applied to claims 1 and 6, respectively, above, and further in view of Yokota et al. (U.S. Patent 6,269,634).

The modified system and method of Pott'142 disclose the invention as cited above, however, fail to disclose that NOx occlusion reduction type catalyst comprises a reducer occluding substance.

As shown in Figures 1, 3, and 4, Yokota et al. disclose an engine control device for an exhaust system comprising a NOx occlusion reduction type catalyst (36); wherein the device is adapted to perform a NOx purge of the NOx catalyst with a time-split fuel injection at

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stoichiometric air-fuel ratio and with reduced or cut-off EGR (see Figure 3). As indicated on lines 53-60 of column 3, Yokota et al. teach that it is conventional in the art to utilize the NOx occlusion reduction type catalyst having a catalyst metal (platinum) and a NOx occluding substance (alkaline earth metal) deposited on an outer layer formed of zeolite which is known in the art as a reducer occluding substance. It would have been obvious to one having ordinary skill in the art at the time of the invention was made, to have utilized the NOx occlusion reduction type catalyst taught by Yokota et al. in the modified system and method of Pott'142, since the use thereof would have been routinely practiced by those with ordinary skill in the art.

### *Response to Arguments*

5. Applicant's arguments with respect to the references applied in the previous Office Action have been fully considered but they are moot in view of the new ground(s) of rejection.

### *Conclusion*

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

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CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

***Prior Art***

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure and consists of four patents: Tanaka et al. (U.S. Patent 6,269,791), Ito et al. (U.S. Patent 6,276,130), Bidner et al. (U.S. Patent 6,490,855), and Okada et al. (U.S. Patent 6,718,756) further disclose a state of the art.



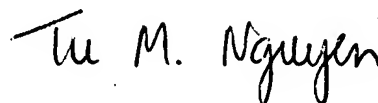
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*Communication*

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Tu Nguyen whose telephone number is (571) 272-4862.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Thomas E. Denion, can be reached on (571) 272-4859. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



TMN

Tu M. Nguyen

September 27, 2006

Primary Examiner

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